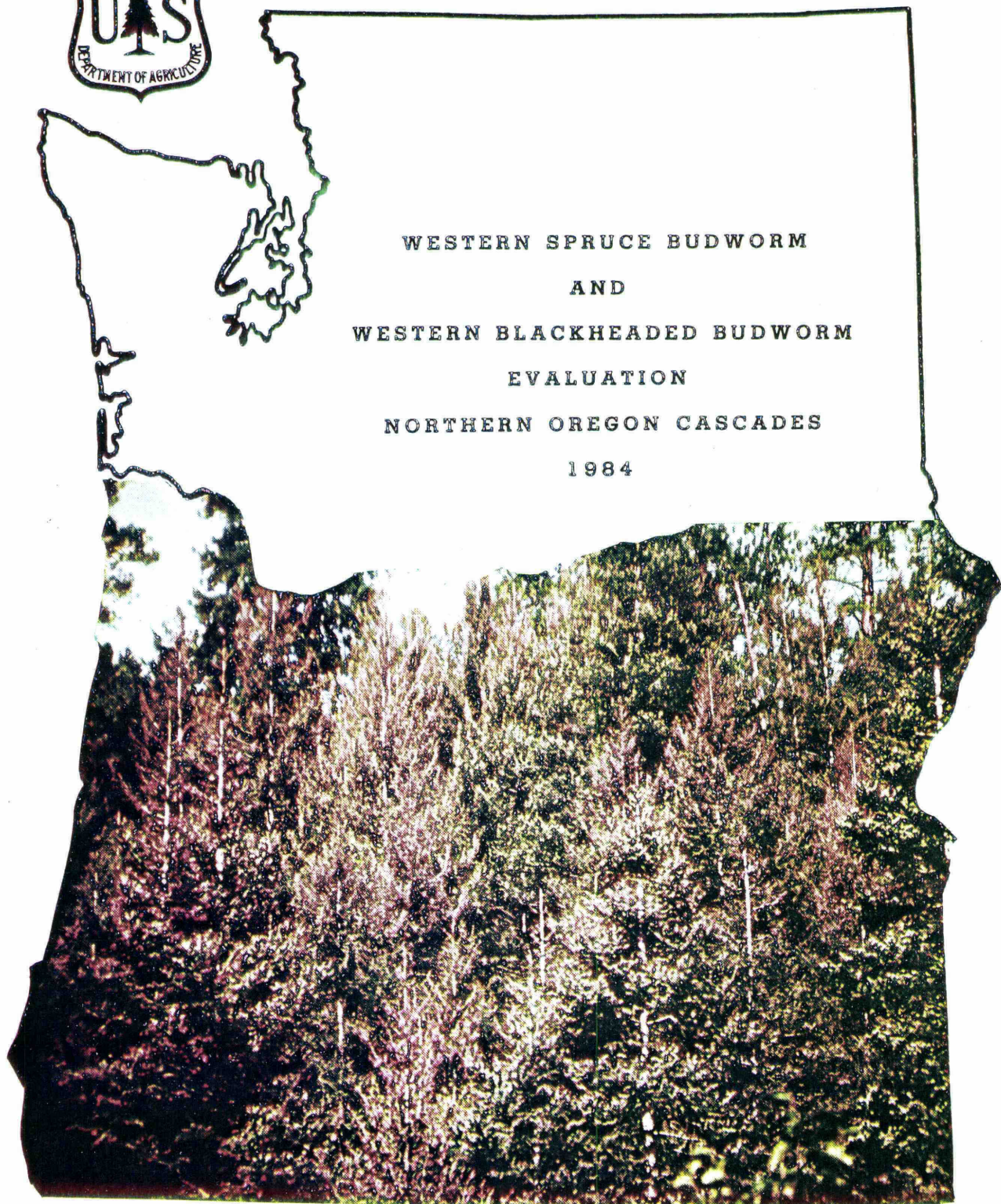


Forest Pest Management *Pacific Northwest Region*

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WESTERN SPRUCE BUDWORM
AND
WESTERN BLACKHEADED BUDWORM
EVALUATION
NORTHERN OREGON CASCADES
1984



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by
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February 1985

INTRODUCTION

Western spruce budworm (WSBW), Choristoneura occidentalis Freeman, defoliation of true firs and Douglas-firs, continued in 1984 on the Mt. Hood National Forest and neighboring Bureau of Land Management, Warm Springs Indian Reservation, State and private lands. This WSBW defoliation on the eastern slope of Oregon's northern Cascades was first detected from the ground in 1982 on the Mt. Hood National Forest and, in 1983, WSBW defoliation was detected during the Cooperative Annual Aerial Detection Survey. The area of defoliation increased from 62,590 acres (25,036 hectares) in 1983 to 146,960 acres (58,784 hectares) in 1984.^{1/}

Western blackheaded budworm (WBBW), Acleris gloverana Walsingham, defoliation was detected from the ground in 1983 in the upper elevations of the east fork of the Hood River and near High Rocks on the Clackamas and Bear Springs Ranger District boundary on the Mt. Hood National Forest. During the 1984 Cooperative Annual Aerial Detection Survey, 24,210 acres (9,684 hectares) of defoliation were observed (Table 1). The preferred hosts of WBBW are true firs, Douglas-fir, western hemlock, and Engelmann spruce.

METHODS AND MATERIALS

Reports of defoliation were ground checked during June, July, August, and September by Forest Pest Management field crews. In several instances, a complex of defoliators was found. The primary defoliators were WSBW and WBBW. Other defoliators included a Neodiprion sp. (sawflies) and a Xylomyges sp. (noctuid moth). WSBW larval populations were sampled at ten sites in or near the out-break area in late June and early July verifying the defoliation. The majority of the sites sampled were in light defoliation areas, the others in moderate to heavy areas. Larval sample plots consisted of three 45-cm branch tips (3 per tree), 20 trees per plot. Trees sampled in each plot were either all true firs or all Douglas-firs, 7 to 14 m tall. Verification of WBBW defoliation areas was done during the pupal stage and during peak moth flight.

^{1/} Sandquist, R.E., et al; 1983. Western spruce budworm evaluation, east slope of northern Oregon Cascades, 1983. Forest Pest Management, USDA-Forest Service, Pacific Northwest Region, Portland, Oregon, 97208. 5 p.

The general WSBW-infested area was visited in September to make adjustments to defoliation boundaries, establish egg mass plots, and estimate 1982, 1983, and 1984 defoliation levels. The objective of the survey was to classify the level of defoliation expected in 1985 at the points sampled.

Egg mass sample plots were located within areas exhibiting 1984 WSBW defoliation. A sample plot consisted of at least 20 45-cm branch tips, one from each of 20 Douglas-fir or 20 true fir. Branch tips were sampled from mid-crowns of trees 7 to 14 meters tall and from lower crowns of trees over 14 meters, using a 14-ft. (4.3 m) pole pruner with catch basket. All branch tips from a plot were placed in a cardboard box, transported to the laboratory and kept in a cool place until they could be examined. Predicted 1985 defoliation levels for each plot were estimated using plot egg mass densities combined with a defoliation classification system adapted from Carolin and Coulter (1972). Defoliation classes used were: light, under 25%; moderate, 25 to 50%; and heavy, over 50%. Branch tips were examined one at a time for egg masses which were then separated into new (1984) and old (1983 and earlier) categories. Examination of branch tips from a plot continued until a density estimate could be made based on a sequential count plan developed by Srivastava and Campbell.^{2/}

Estimates of 1984 defoliation levels for each sample plot site were made by examining and classifying defoliation levels of 20 new shoots from each of the first five midcrown branch tips from trees 7 to 14 meters tall. Defoliation estimates for 1983 and 1982 were made by looking at each of these same five branch tips as a whole and determining a defoliation rating for each of the two previous years' growth.^{3/}

RESULTS AND DISCUSSION

Light WSBW defoliation occurred around Oak Grove and Middle Mountain in the Hood River Valley and along a higher elevation band (3000 to 5000') from the east side of Shell Rock on the Hood River Valley Ranger District south to Rocky Butte on the Barlow Ranger District. New, light WSBW defoliation occurred around Cooper Spur ski area and in several small areas on the northwest side of the Warm Springs Indian Reservation. Continued heavy WSBW defoliation occurred in the area of Gordon Butte, Jordan Butte and Camp Baldwin on the Barlow Ranger District. New, heavy WSBW defoliation occurred around Pine Grove, along the easterly edge of host type, and south into the Warm Springs Indian Reservation and areas of private land ownership; and also in the drainages south and west of Lookout Mountain including the upper Badger Creek drainages (See Figure 1). Table 2 shows the larval densities from each sample plot.

^{2/} Srivastava, N., and R.W. Campbell; 1982. Sequential classification and count plans for populations of the western spruce budworm; egg masses, instar IV and pupae. USDA Forest Service, Pacific Northwest Forest and Range Experiment Station, Corvallis, Oregon, 97331. 28 p. (Unpublished).

^{3/} Hostetler, B.B. 1984 Western spruce budworm egg mass and defoliation surveys in Oregon and Washington, 1984. Forest Pest Management, USDA Forest Service, Pacific Northwest Region, Portland, Oregon, 97208.

Egg mass samples indicate continued WSBW defoliation in 1985 in areas that had heavy defoliation in 1984. Table 3 shows the egg mass densities and predicted defoliation for each sample plot. No egg mass samples were collected outside the defoliation area, so no predictions of 1985 defoliation were made for these areas, although small 1984 "hot spots" could increase in size.

Western blackheaded budworm defoliation was observed west of the main western spruce budworm outbreak in a band around the southeast side of Mt. Hood. This is wetter and higher in elevation with different stand characteristics than WSBW areas (Figure 2). WBBW defoliation levels increased dramatically in 1984 both in the Washington and Oregon Cascades. Light defoliation was observed near High Rocks, in the Bull Run Watershed, on the west side of Clear Lake and on the south slopes of Zig Zag Mountain. Heavier WBBW defoliation was seen in and around Mt. Hood Meadows ski area, from Government Camp south to Veda Butte, and Trillium Lake. Continued WBBW defoliation is expected for 1 to 2 years without substantial damage. An outbreak of WBBW was previously recorded on the Mt. Hood National Forest in 1960. It covered 440 acres and subsided after 1 year (Buckhorn and Orr, 1961). Western blackheaded budworm populations historically build for 1 to 3 years, then subside, often abruptly.

RECOMMENDATIONS

Continued WSBW defoliation is expected on the eastern slope of the Oregon Cascades in 1985. An economic analysis is recommended to determine whether the resource values warrant management action to reduce potential damages and if an environmental impact statement is needed. The Cooperative Annual Aerial Detection Survey, with follow-up ground checking, will be conducted by Forest Pest Management and the Oregon State Department of Forestry in 1985 to monitor WSBW and WBBW population status. Any unexpected changes in status will immediately be brought to land managers' attention.

Table 1. Acreages of WSBW and WBBW defoliation detected on or adjacent to the Mt. Hood National Forest during 1983 and 1984.

REPORTING AREA	WSBW		WBBW
	1983	1984	1984
Barlow Ranger District	52,610	87,650	0
Bear Springs R.D.	1,770	6,910	650
Clackamas R.D.	0	0	0
Columbia R.D.	0	0	2,080
Hood River Valley R.D.	790	9,830	2,310
Zig Zag Ranger District	0	0	16,360
Warm Springs Indian Res.	1,480	13,170	0
B.L.M.	70	980	0
State and private	5,870	28,420	1,140
Mt. Hood Wilderness Area	0	0	1,670
Total	62,590	146,960	24,210

Table 2. 1984 WSBW larval population densities at peak instar IV on or adjacent to the Mt. Hood National Forest.

PLOT NO.	TWN	RNG	SEC	1/4	ELEV.	LARVAE/100 BUDS	AREA
1.	2N	- 9E	- 13	SE	2000'	19.8	Hood R. Co. (Oak Grove)
2.	1N	- 11E	- 31	SW	3800'	3.9	Long Prairie
3.	1N	- 11E	- 20	NW	3400'	1.7	Hood R. Co.
4.	1N	- 11E	- 17	NW	3200'	2.8	Hood R. Co.
5.	1S	- 11E	- 6	SE	3700'	3.4	Champion lands
6.	2S	- 12E	- 7	SW	3200'	44.1	Barlow RD (Rd 44)
7.	5S	- 10E	- 24	NE	3400'	8.0	Bear Springs
8.	5S	- 10E	- 24	NW	3400'	3.8	Bear Springs
9.	5S	- 10E	- 22	SE	3300'	4.0	Bear Springs
10.	5S	- 11E	- 30	SE	3200'	38.2	Warm Springs I.R.

Table 3. 1984 WSBW new egg mass densities, 1984 defoliation levels and predicted 1985 defoliation levels at plots on or adjacent to Mt. Hood National Forest.^{3/}

PLOT NO.	TWN	RNG	SEC	1/4	DEFOLIATION ^{a/}			NEW EGG MASS DENSITY (EM/M2) ^{b/}	PREDICTED 1985 DEFOLIATION LEVEL ^{c/}
					1982	1983	1984		
MT. HOOD NATIONAL FOREST									
1.	1S	- 10E	- 24		2	3	3.7	15.0	HEAVY
2.	1S	- 11E	- 28		2	5	5.7	15.7	HEAVY
3.	2S	- 11E	- 12		4	5	5.9	10.0	MODERATE
4.	2S	- 11E	- 18		2	2	4.0	(0.5)	LIGHT
5.	2S	- 11E	- 34		2	4	5.8	12.9	HEAVY
6.	5S	- 11E	- 19		4	5	5.6	16.4	HEAVY
WARM SPRINGS INDIAN RESERVATION									
7.	5S	- 10E	- 34	NW	2	2	1.5	12.9	HEAVY
8.	7S	- 11E	- 1	NE	2	2	1.8	2.6	LIGHT
9.	9S	- 11E	- 18	SE	2	2	5.3	12.9	HEAVY
10.	10S	- 9E	- 34	SE	2	2	2.0	6.4	MODERATE

^{a/}Defoliation indices for each year are based upon a 6-class rating system, each index number representing a certain level of defoliation on foliage during that specific year: 1= 0%; 2= 1 to 25%; 3= 25 to 50%; 4= 50 to 75%; 5= 75 to 99%; and 6= 100%.

^{b/}Density estimates are at a precision level of 25% except for those in parentheses which have a precision level greater than 25%.

^{c/}Categories of predicted 1985 defoliation are: light, less than 25%; moderate, 25% to 50%; and heavy, greater than 50% of current year's foliage.

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Figure 1. Western Spruce Budworm Defoliation 1984

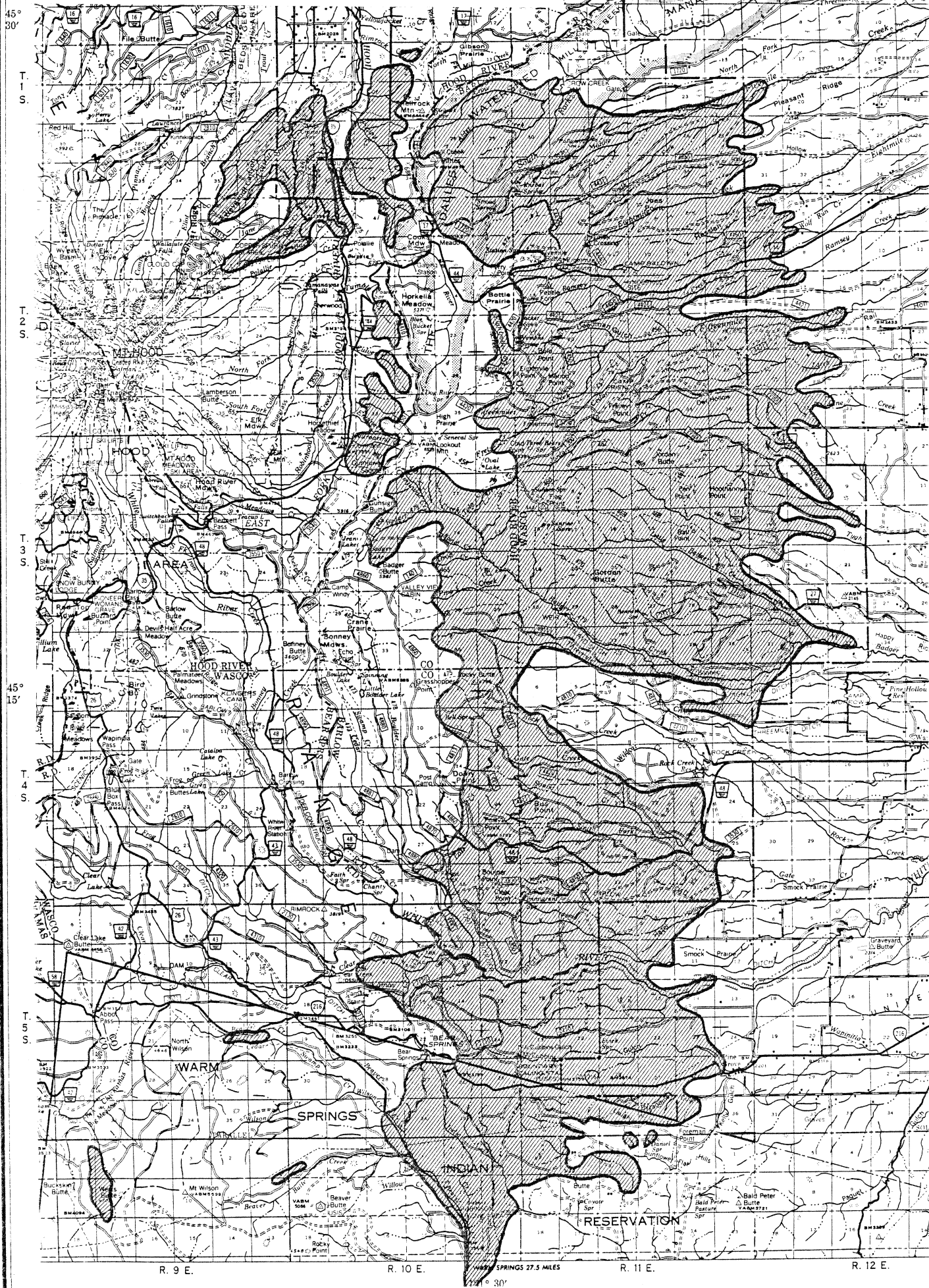


Figure 2. Western Spruce Budworm and Western Blackheaded Budworm Defoliation 1984.

